Common injuries in Iranian female elite badminton players

Bahareh mahmudieh¹, Golnaz Faezi², Mohammad Husien Alizadeh³, Nader Rahnama⁴

1. PhD candidate in Sport Medicine, University of Tehran, Kish International Campus, Department of sport Sciences, Kish Island, Iran
2. M.S in Sport Sciences, Kharazmi University, Faculty of Sport Sciences, Karaj, Iran
3. Associate Professor, University of Tehran, Faculty of Sport Sciences, Department of Sport Medicine, Tehran, Iran
4. Associate Professor, University of Isfahan, Faculty of Sport Sciences, department of Sport Medicine, Isfahan, Iran

Corresponding Author: Bahareh Mahmudieh
Email: baharehmahmudieh@yahoo.com
Tell: +987644430056
Fax: +987644432683

Abstract
The aim of present study was the survey of Incidence of injuries in Iranian female’s elite badminton players. Methods: Sixty one injury reports forms that approved by sport medicines professionals were distributed in Iranian female elite badminton players (age: 19.25 ±4.89, height: 165 ±5.16 cm) who were participated in 2011-2012 Iran badminton Super League. This form had four part that fist and second part of form were related to demographic and champion history and third and fourth part were related to injuries conditions and injuries record form. The current study is the first study that surveys the incidence of injuries in Iranian female’s elite badminton players. Data descript using by descriptive method and were analyzed using by $\chi^2$ (p≤0.05). Results: Fifty two percentages of participants were young adults and 48 percentages were youth and adolescent. Also, %23.2 of participants was single players, %21.4 of participants was double players and %55.4 of participants was boss single and double players. Incidence of injuries in lower extremities (87.5%) was more than the upper extremities (12.5%). Most common injuries in females badminton players were strain (44.4 %) and sprain (22.2 %). Most common stroke that were reason for injuries included underhand (50%), Smash (12.5%), defense (12.5%) and other stroke (25%), respectively. Conclusion: In conclusion, the most common injuries sustained by Iranian female elite badminton players were strain and sprain injuries. It recommend to coaches that use preventive training in for strain and sprain and strength lower extremities in badminton players.

Key words: Badminton Injuries, incidence, injuries mechanism.
Introduction

According to the International Badminton Federation, 200 million people of all ages play badminton worldwide, approximately (Fahlstrom 2007). Badminton as an individual, non-contact sport requires a combination of jumps, lunges, quick changes in direction and rapid arm movements and is a popular racquet game in Iran. The technique is relatively easy to learn, but high skill and training is required to reach high levels (Lees A 2003 and Fahlstrom, 2002). At high levels, it demands quick reactions, speed, coordination, and good physical condition (Fahlstrom, 2002).

Some researchers studied the badminton injuries. Fahlstrom et al (2006) reported that shoulder pain is a common problem among both men and women badminton players (Fahlstrom et al 2006). Young et al (2007) indicated that shoulder pain is the most common problem in upper extremities. It also recorded that it has the highest incidence rate in elite senior athlete, which shows that overuse was one of the major reason of them (Yung et al., 2007). However, Kroner et al (1990) reported that lower extremity injuries are the most common among badminton injuries, which accounted for 82.9% of all the cases. Joint and ligament injuries were the most frequent (58.5%), while muscle injuries came second (66.9%) (Kroner 1990). Yung et al (2007) demonstrated that elite senior athletes sustained more recurrent injuries, while elite junior and potential athletes sustained more new injuries (Yung et al 2007). Studies showed that overuse injuries are the most frequent type in badminton players (Fahlstrom 2006, Shariff et al 2009).

Some studies suggested that gender is an intrinsic risk factor for sport injuries (Øyen J 2009 and Edwards W 2008 ). However, Shariff et al (2009) reported that there is no significant difference between the prevalence and types of badminton injury between genders. Also, they showed that the majority (58.8%) of injuries occurred in the younger age group (< 20years) (Shariff 2009).

Recently, Iranian females are participating in badminton training and international events such as Asian games, Olympic qualified, Fajr International badminton tournament and western Asian games. Information regarding injuries affecting Iranian female elite badminton players still is unknown. Thus, the aim of present study is to clarify common injuries in Iranian female elite badminton players.

Methods

Subjects. The subjects were female badminton players. They were from 12 badminton clubs who were participated in season 2010 -2011 Iran badminton primer league (n= 61) (age = 19.9 ± 5.03 years).

Instruments. A self-designed injury form was used for data collection. Methods for developing the self-designed injury form were based on reviewing the papers which were related to this study topic. This injury form had 4 parts. The first part were consisted the demographic information of the subjects such as age, high, weight, age class and types of game. They were not required to write their names. The second part were included the athletic history of subjects such as mean time of training sessions in days and weeks. Third part of this form were included the injuries caused by badminton in one year period such as number of injuries, season of injury (preparation period or competition period), time of injury (training, single game or double game), type of stroke (i.e. clear, smash, net, underhand, drive, overhead, around head and etc), site of court, mechanism of injury occurrence (i.e. jumping, landing, sliding, swing, and diving), causes of injuries (i.e. incorrect technique, fatigue during completion, fatigue during training, quality of shoes, gym temperature, weak fitness, nutrition, incorrect training and stress and anxiety etc), type of treatment, treatment period and home and away games. Fourth part of injury form were
consisted the common injury such as type of injury, injured limb and site of injury. Distribution of the injury forms to different clubs was started from September 2011. The injury forms were distributed to coaches and team managers of different badminton clubs. In this study an injury was defined as any pain or disability sustained by a badminton player during competition or training activities, resulting in time away from sports participation.

**Data analysis.** Descriptive data using by descriptive method and were analyzed using by χ². Significant level was set as p≤0.05. All data were analyzed using by the SPSS software (Version 18).

**Result**
Fifty two percentages of participants were young adults and 48 percentages were youth and adolescent. Also, %23.2 of participants was single players, %21.4 of participants was double players and %55.4 of participants was boss single and double players. Eight players (13.6%) had injuries in current season of the league. Four players were injured in preseason and four players were injured in the race season. Incidence of injuries in lower extremities (87.5%) was more than the upper extremities (12.5%). Table 1 demonstrates the injury areas in most of injuries were occurred in the mid-part of final game (75%). Most common injuries in females badminton players was strain (44.4 %), sprain (22.2 %), tear and fracture (22.2%). Causes of injuries in female players were improper technique, inappropriate hall floor and weak conditioning, respectively. Mechanisms of injuries in female Iranian elite badminton players were landing (28.6%), landing with rotation (28.6%) and stop suddenly (28.6%) and toe off (14.2%). Table 2 indicates the zone of the court where injuries has been occurred. Most common stroke that were reason for injuries included underhand (50%), Smash (12.5%), defense (12.5%) and other stroke (25%), respectively.

<table>
<thead>
<tr>
<th>Anatomical Areas</th>
<th>Number of players with injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder</td>
<td>1</td>
</tr>
<tr>
<td>Elbow</td>
<td>0</td>
</tr>
<tr>
<td>Back</td>
<td>0</td>
</tr>
<tr>
<td>Knee</td>
<td>5</td>
</tr>
<tr>
<td>Ankle</td>
<td>2</td>
</tr>
</tbody>
</table>

**Table 2. Zone of the court where injuries has been occurred**

<table>
<thead>
<tr>
<th>Zone of the Court</th>
<th>Number of injures (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forehand forward</td>
<td>6 (71.4)</td>
</tr>
<tr>
<td>Backhand backward</td>
<td>0</td>
</tr>
<tr>
<td>Forehand backward</td>
<td>1 (14.3)</td>
</tr>
<tr>
<td>Backhand forward</td>
<td>1 (14.3)</td>
</tr>
</tbody>
</table>

**Discussion**
The present study indicated that the incidence of injury for Iranian female elite badminton players was 13.6 percentages. Injuries affecting Iranian badminton player are not fully understood. This was the first known epidemiological study to investigate badminton injuries among elite Iranian athletes. Most of the injuries diagnosed were in the mild category. Badminton is a non-contact sport that requires jumps, lunges and quick changes in direction, together with rapid arm movements from a wide variety of postural Positions. Not surprisingly, the commonest area of injury was the lower extremities (87.5%). These findings are in agreement with others findings. Also, Jørgensen and Winge found 58%...
of lower extremity injuries in their study of elite level badminton players. A higher percentage of lower extremity injuries (82.9%) were observed in Krøner et al’s prospective one-year study; however, these studies included only recreational badminton players. The game of badminton may be related to abnormal intratendinous flow in the Achilles tendon. On the other hand, Kimura et al (2011) reported that ACL injuries is high in elite badminton players as Increased knee valgus angle and moment following back-stepping to the backhand-side might be related to the higher incidence of ACL injury during single-leg landing after overhead stroke (Kimura et al 2011). Lower extremity injuries are common in badminton players include knee, leg, Achilles tendonitis, shin splints, and cramps. These injuries are common in sports such as badminton that require constant running and repetitive jumping.

The most frequent injuries were strains and sprains as reported in other researches (Hoy et al. 1994; Kroner et al. 1990; Yung et al 2007). A sprain is caused by direct or indirect trauma (a fall, a blow to the body, etc.) that knocks a joint out of position, and overstretches, and, in severe cases, ruptures the supporting ligaments. Typically, this injury occurs when an individual lands on an outstretched arm; slides into a base; jumps up and lands on the side of the foot; or runs on an uneven surface. Yung et al (2007) surveyed the injuries in Hong Kong elite badminton athletes. Their findings are in accordance with the findings of present study. However, the comparison between two studies is difficult, because more prospective studies aimed toward understanding injuries and their mechanisms are essential in developing optimal injury management and prevention strategies. It seems that lumbo-pelvic (core) control may have a large effect on knee-joint control and injury risk resulting in reduction of lower extremity (Mendiguchia J et al 2011 and Kondri M et al 2011). Thus, badminton elite players should use of core stabilities exercise or training for reduction of risk injury. In general, a high percentage of injuries in lower extremities indicate that badminton players should pay more attention in choosing appropriate footwear to avoid those injuries and pay attention this site of body in your training.

CONCLUSION
The most common injuries sustained by Iranian female elite badminton players were Strain and Sprain injuries. Most of the injuries are not serious enough to warrant any form of surgical intervention. Most badminton players were not knowledgeable about the appropriate ways to prevent these injuries. Mechanisms of injuries in female Iranian elite badminton players were landing, landing with rotation and stop suddenly.

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References
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